# Modern Concepts of Cardiovascular Disease

*Published monthly by the* AMERICAN HEART ASSOCIATION

1775 BROADWAY, NEW YORK 19, N. Y.





VOL. XXI JUNE, 1952 No. 6


## MANAGEMENT OF ESTABLISHED AURICULAR FIBRILLATION

### With Especial Reference to the Use of Quinidine*

Auricular fibrillation occurs in patients with and without heart disease. It may be paroxysmal or established and may or may not give rise to symptoms and signs. The striking increase in the ventricular rate with which it is frequently associated may seriously compromise cardiac function. It can lead to congestive heart failure or to the substernal pain characteristic of inadequate coronary blood flow and myocardial anoxia. Faintness, dizziness, and syncope may occur as manifestations of cerebral ischemia. Weakness, pallor, and coldness of the extremities have been noted. All these effects may occur in patients who have underlying heart disease at ventricular rates which produce few manifestations in patients without heart disease.

### USE OF DIGITALIS WITH AND WITHOUT QUINIDINE

Treatment consists essentially in using either digitalis to control the ventricular rate by increasing auricular-ventricular block or quinidine to restore normal sinus rhythm. Whenever a rapid ventricular rate is present with or without congestive failure or evidence of coronary, cerebral, or peripheral ischemia, digitalis is the drug of choice. The dosage and methods of administration have been adequately described elsewhere. It must be remembered, however, that digitalis should be given with caution in the presence of acute myocardial infarction. When there are other underlying factors such as hyperthyroidism, fever, or pulmonary infarction, adequate slowing of the ventricular rate may not occur despite digitalis given to toxicity. Once the immediate effects of the rapid rate have been brought under control and the underlying factors treated, consideration can be given to the use of quinidine to restore normal sinus rhythm.

In those patients with auricular fibrillation who manifest a slow ventricular rate digitalis can be used for the control of concomitant heart failure, and should be given if quinidine is to be used. Most patients with auricular fibrillation given quinidine show a progressive slowing of the auricular rate to the point of auricular flutter. Auricular-ventricular conduction is improved, and as a result the ventricular rate rises. Therefore, digitalis should be given prior to the administration of quinidine to prevent the development of such rapid ventricular rates as otherwise might require the discontinuance of the quinidine.

### INDICATIONS AND CONTRAINDICATIONS FOR QUINIDINE

Bundle branch block or defective intraventricular conduction associated with auricular fibrillation are considered as relative contraindications to the use of quinidine because of the possibility of further depression of ventricular conduction although conclusive evidence for the producing of this effect by quinidine is wanting. Complete heart block is an absolute contraindication to the use of quinidine.

The ultimate success of quinidine therapy depends on whether normal sinus rhythm can be restored and maintained and, if it can, on the benefits derived from a normal rhythm. About 50 per cent of patients with established auricular fibrillation can be converted to normal sinus rhythm and about 25 per cent maintained in that state.[1] Long duration of auricular fibrillation, cardiac enlargement, cardiac failure, and the presence of rheumatic heart disease are factors which operate against successful restoration but do not preclude it. There is evidence that some patients may revert on subsequent attempts even though the first trial of quinidine has been unsuccessful.

The major benefit to be derived from a normal sinus rhythm is the slower ventricular rate. Even when digitalis controls the ventricular rate of patients at rest, it may fail to do so during exercise. It has been shown that there is a higher ventricular peak rate response to exercise in patients with auricular fibrillation irrespective of whether digitalis has been employed.[2] After restoration of normal sinus rhythm this peak rate response is significantly reduced. It has also been shown that there is a much more adequate increase in cardiac output during exercise in patients with auricular fibrillation after conversion to normal sinus rhythm.[3] All this suggests that even in the


*From the Medical Service, Cushing Veterans Administrative Hospital, Framingham, Mass.

presence of cardiac compensation, adequate digitalis, and a controlled resting ventricular rate auricular fibrillation has disadvantages which may be lessened by restoration of normal sinus rhythm.

Thrombosis in a dilated auricle is favored by auricular fibrillation. It is well recognized that embolism is a major hazard in this situation. Whether or not normal rhythm will prevent thrombus formation and peripheral embolism has not as yet been clearly established. There is considerable evidence that the hazard of embolism attributed to conversion of auricular fibrillation to normal sinus rhythm by quinidine has been greatly overemphasized.

## METHOD OF ADMINISTRATION OF QUINIDINE

A satisfactory program for the administration of quinidine sulfate is as follows: Every two hours 0.2 gm is administered by mouth for seven doses beginning early in the morning. The individual dose is then increased 0.1 gm daily until the patient receives 0.5 gm every two hours for seven doses. If restoration to normal sinus rhythm occurs at any time, this schedule is then interrupted and the patient is placed on a maintenance dose of 0.2 gm every six hours for approximately one month. Most patients who will revert to normal rhythm as a result of quinidine administration usually do so with moderate doses of the drug.

Studies of blood quinidine levels indicate an increasing concentration when the drug is given every two hours. Twelve hours after the administration of the last dose approximately 30 per cent of the peak level will be present.[4] Three and a half grams of quinidine in a twelve-hour period generally lead to serum levels of 10 mg per liter or more. When the concentration exceeds this value, the possibility of serious toxicity increases, and the likelihood of successful conversion decreases.

*Oral administration suffices in practically all* patients. Rarely the urgency of the situation combined with inability to take medication by mouth will require intramuscular administration. There are several satisfactory preparations available. They result in slightly higher blood levels achieved somewhat sooner but not strikingly so. Therefore, the dosage and precautions described for oral medication will obtain with parenteral administration.

## TOXIC MANIFESTATIONS OF QUINIDINE

Most patients tolerate the indicated therapeutic doses with but minor symptoms of cinchonism. Anorexia, nausea, vomiting or diarrhea occur in about 50 per cent of patients but rarely are these symptoms severe enough to require discontinuance of the drug. Central nervous system symptoms such as tinnitus, vertigo, or confusion occur in less than 10 per cent of patients and usually require withdrawal of quinidine. The rare episodes of fever, purpura, or rash necessitate immediate omission of the drug.

The most important toxic effect of quinidine is on the heart itself. It is important to recognize that increase in intraventricular conduction time and ectopic ventricular beats may occur. The degree of widening of the QRS complex allowable before discontinuance of the drug has not been clearly established. As a rule, therapy should not be pursued when the QRS duration spreads 25 per cent. The onset of ventricular premature beats following the use of quinidine calls for the immediate cessation of the drug lest ventricular tachycardia supervene.[5] This arrhythmia may occur with moderate doses; therefore, close clinical and electrocardiographic observation is imperative during the use of quinidine.

## SUMMARY

The selection of patients with established auricular fibrillation for conversion to normal sinus rhythm remains controversial. The various factors which must be taken into consideration, the likelihood of success, the benefits which may obtain, and the precautions which must be used have been detailed.

There is growing evidence that an attempt to restore normal sinus rhythm should be made in any patient with established auricular fibrillation who is ambulatory and does not show serious ventricular conduction defects. This attempt to restore normal sinus rhythm should be made after the underlying disease has been treated, the ventricular rate controlled by digitalis, and only when frequent clinical and electrocardiographic observations can be made.

Morton G. Brown, M.D.
Framingham, Massachusetts

REFERENCES

1. *Holzman, D. and Brown, M. G. The Use of Quinidine in Established Auricular Fibrillation and Flutter.* Am. J. Med. Sci. 222:644, 1951.
2. Wetherbee, D. G., Brown, M. G., Holzman, D. *Ventricular Rate Response Following Exercise During Auricular Fibrillation and After Conversion to Normal Sinus Rhythm.* Am. J. Med. Sci. *In Press.*
3. Kory, R. C., Meneely, G. R. Cardiac Output in Auricular Fibrillation With Observations on the Effects of Conversion to Normal Sinus Rhythm. J. Clin. Invest. *30:653, 1951.*
4. Unpublished Data.
5. Wetherbee, D. G., Holzman, D., Brown, M. G. *Ventricular* Tachycardia Following the Administration of Quinidine. Am. Heart J. 43:89, 1952.